

PRINCIPLES OF SCIENTIFIC PUBLICATION

Scientific investigators may be grouped under the following categories: (1) The independent worker, *i.e.*, the individual who devotes a part or all of his time to investigation, carrying on his researches with his own financial resources. On the basis of motivation, this group of workers may be further differentiated as: (a) the investigator who does his work for what he can discover of saleable value, (b) the investigator who works because his problem bears a certain degree of fascination or interest, (c) the investigator who carries on because he is convinced that his investigation will benefit and advance the race (medical). (2) The salaried worker. This group also may be divided into: (a) the government, medical and museum investigator (with ideals of b and c, above), (b) the industrial investigator.

The person who is hired by the government, museums, or business is being paid to investigate. Nothing is said about publication. That is always an entirely separate matter. A business concern pays such an incumbent to carry on investigations, *not* to publish any findings. Museums usually maintain a Journal for publication of results, as also some research institutions, and the government. If a research hospital or institute wishes to become renowned through the high quality of its research it should be willing to pay for the publicity. The investigator who works to satisfy his curiosity or his desire for knowledge concerning a phenomenon of nature is under no more obligation to publish than is the man who discovers a new move in chess, or a new way of applying pigment to canvas—especially when he himself bears the expense of the investigation. Since when is a person under obligation to publish the fruits of his hobby? If Society wishes to benefit by the investigations of the men who voluntarily go through hours, days and months of drudgery and grind in order to discover a truth or principle of nature, Society should be willing to pay for the publication of his findings. After all, life, like marriage, should be a coöperative enterprise, and to expect or compel the investigator to shoulder the

burden of publication, in addition to the drudgery and cost of the investigation, is not only short-sighted but lacking in social sensibility and a sense of justice.

Publication is not a part of research. Research terminates when the investigator has discovered that for which he is seeking. If Society or the investigator's institution wishes, for reasons of its own, to know the result of any investigation, it should be willing to shoulder the burden of publication.

A recent article,¹ purporting to be a contribution on the publication problem, breaks down completely because its author fails to analyze his data, and because he fails to take more factors into consideration. In the fifth paragraph of that article, only the salaried investigator seems to be considered. The paragraph is not even clear as to who "rends the air with cries of anguish," the investigator or his institution. Certainly it should not be the worker. If the institution, what? Museums and government investigations are supported by the public. Is it the museum, or the public, or the government official which is rending the air? If the public hires research workers through museums, hospitals, or experiment stations to carry on investigations, should not the public pay for publication of the results? If the investigator is hired by an endowed research institution, that institution may publish or not as it sees fit (and they usually do). Why should it publish? Did the benefactor stipulate that the money should be used for publication? If Society desires the benefit of the investigations should it not be willing to pay for the publication?

There is no relation between research and publication, except in so far as Society desires the benefits of research. This applies especially to the independent investigator and independent research institutions. Society should be so organized that through endowments, the results of investigations may automatically be published. In fact Society should be so organized as to be able to adequately hire all capable investigators.

This brings us to the old question of what constitutes publication. There has been a tendency in recent years to shirk responsibility of publishing so-called "raw data."

All data should be published. One of the fundamental characteristics of scientific work is that it is so conducted that it may

¹ Science, 84: 310-311, October 3, 1936.

be repeated or checked up—gone over by others as often as necessary and with whatever variations may be deemed advisable. This presupposes publication of all data and methods. Data unpublished is data lost. The structure built on this lost data is a structure without visible or substantial foundations. The next architect is unable to examine the foundations of the edifice. He must then go through the arduous and time consuming process of accumulating another set of data in order to check up on the stability of the superstructure. The suppression of raw data hampers discussion and criticism, one of the fundamental characteristics of science. I can well perceive how delighted pseudo-scientists would be to place their “discoveries” beyond the pale of criticism and discussion by the suspension of their raw data.

The filing of “raw data” in the institution’s morgue is unsatisfactory to any worker separated by an ocean or even a continent. It will cost him as much to go to the data as it would cost to have the data published. To have the data sent him will entail risk of loss. The same expense and hazard is repeated with the second, the third, and other reviewers or checkers. Inevitable wars jeopardize such filed data. So does a change in department head, or future shortage of space. We have recently witnessed the junking of years of accumulated material by a new museum president who did not fancy a certain line of investigation. Publication makes data virtually indestructible and makes it available on all continents and in all culture centers. It is the obligation of organized Society to make such data available to its underpaid investigators in all countries. In the long run, it is more economical to pay for such publication. Society’s obligation is to endow scientific publications, as well as museums, hospitals, university buildings, bell towers, and dog cemeteries.

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